

Interactive comment on “Impacts of simulated herbivory on VOC emission profiles from coniferous plants” by C. L. Faiola et al.

Anonymous Referee #1

Received and published: 14 October 2014

This manuscript is timely and it has important approach to elucidate the role of biotic stresses for induced emissions of volatile terpenes from conifers. Introduction is covering rather comprehensive the current knowledge of different type of stresses on plant VOC emissions and their potential as precursors of secondary organic aerosols. Elicitor compound methyl jasmonate (MeJA) which affects very efficiently the biosynthesis of terpenoids was selected as to simulate herbivore impact on five conifer species. This manuscript could also have value for environmental impact assessment of modern preventive pest control methods where plant defences are activated with elicitors before pest insect attack. Earlier observations of MeJA treatments on conifers have demonstrated that climate-relevant sesquiterpenes and GLV compounds can be even more responsive to elicitor than monoterpenes (Semiz et al. 2012).

C5909

Selected GC-MS-FID methodology to assess VOC emissions in different time point is excellent and gives valuable data of monoterpene emission profiles of studied conifer species. Unfortunately, the experimental set up has some serious flaws and does not meet e.g. the requirements of ecological or plant science journals of genuine biological replicates. Experiment with each species is run only once and in VOC studies three out of five species did not even have the control group of plants where to compare the effect elicitor treatment. In the case of control treatment, it was not run at the same time as elicitor treatment. Therefore the main approach to compare VOC emission before and after elicitor treatment does not allow estimating the impact of elicitor treatment on VOC emission rates and separate the time depended fluctuation of VOC emission rates from elicitor depended fluctuation.

It is explained that this study is actually aimed for studies of stress effects on the composition of subsequently formed secondary organic aerosols and results will be published in a separate paper. This nearly unexplored are of biotic stress effect on atmospheric SOA formation in a companion paper will definitely add the value of this manuscript.

SPECIFIC COMMENTS P. 13461, Line 27. If already published, give a citation here.

P. 13462, L. 14. If there were clear symptoms of natural stressor in some of the plant where the most influenced plants included in the experiments? If included, it might give some bias in the results.

P. 13468, L. 23. This is what one should expected, when studying another provenance of the same tree species. Merely the genotypic variation without any elicitor treatment affects the ratio of monoterpenes in conifers.

P. 13470, L. 15-15. This is very odd choice of methodology. After stressor treatment exactly the same seedlings were used as water-treated and then again as stress-treated seedlings. Why? During active shoot growth in early season VOC synthesis is found to be more responsive to elicitors in *Pinus sylvestris* than after ceasing of elongation growth. This might be the case also with *Picea pungens*.

C5910

Reference Semiz,G., Blande, J.D., Heijari, J., Işık, K., Niinemets Ü & Holopainen, J.K. 2012. Manipulation of VOC emissions with methyl jasmonate and carrageenan in evergreen conifer *Pinus sylvestris* and evergreen broadleaf *Quercus ilex*. *Plant Biology* 14, Suppl 1: 56-65.

Interactive comment on *Biogeosciences Discuss.*, 11, 13455, 2014.

C5911